Section 6.1 General

Adequate enforcement of HOV violations is a necessary element for a successful HOV system. The threat of receiving a citation for an occupancy violation is a strong deterrent to the illegal use of the HOV lanes and studies have shown that violation rates increase when enforcement levels are low. Therefore, enforcement considerations must be accounted for during the planning, design, and operational phases of all HOV projects. The California Highway Patrol (CHP) involvement in all phases of development is beneficial. The CHP is the responsible agency in HOV lane enforcement issues, and they are an integral part of ensuring a successful HOV facility.

Section 6.2 Role of Enforcement

Experience with HOV facilities has clearly demonstrated that enforcement is required to develop an appropriate public attitude toward these facilities. In fact, the presence of a CHP officer has a beneficial impact. Such benefits usually correlate directly to the level of the officer's presence and are related to the motorist's perception of the extent of enforcement. In addition, this perception can be affected by the following factors:

- How frequently are enforcement units observed?
- Are enforcement units observed issuing citations?
- Are the fines sufficiently high to deter the illegal use of the HOV facility?
- Is the enforcement unit moving with the flow of traffic or is it parked?

A properly designed enforcement program is essential to the success of HOV facilities. The role of enforcement is to ensure proper implementation and compliance of the program. California Vehicle Code (CVC) Section 2400 places enforcement responsibility for State highways constructed as freeways under the jurisdiction of the CHP. It follows that the enforcement of laws relative to HOV facilities falls under the jurisdiction of the CHP. The Judicial Council of California (JCC) sets the fines and maintains the Uniform Bail and Penalty Schedule (UBPS) for traffic violations. See Appendices A-7 through A-10, California Vehicle Code Section 42001.11, Traffic Penalty Schedule and the California Penal Code for further explanation of minimum violation fines.

Section 6.3 Violation Rates

The task of keeping violation rates within reasonable bounds implies an ability to determine an acceptable violation rate. Based on California's HOV operations, a rate below ten percent (10%) is preferable. Establishing a standard for acceptable violation rates on a particular facility should include safety considerations, freeway operations, public attitudes, and practicality.

A. Safety Considerations

Past studies suggest there is no consistent correlation between accident rates and occupancy violation rates on any of California's HOV facilities. However, the practice of weaving in and out of a HOV lane creates a safety issue for the violator as well as for other traffic.

B. Freeway Operations

Many of California's HOV facilities are operating near capacity. As traffic flow approaches capacity, violations

represent a threat to the timesavings and other benefits of HOV facilities.

C. Public Attitudes

Even where there is intense public sentiment against the HOV facility, drivers recognize violations as a problem. Drivers tend to over-estimate violation rates and are likely to be critical if actual violation rates are above 10%.

D. Practicality

Experience suggests that routine enforcement combined with moderate applications of heightened enforcement can keep HOV violation rates within the 5% to 10% range. Consistent heightened enforcement would be necessary to drive violation rates below 5% and would have little effect on freeway performance. It is recommended that a target level below 10% be considered for mainline HOV facilities.

Section 6.4 Enforcement Alternatives

Detection of occupancy violations by video technology is not yet sufficiently reliable to eliminate on-the-scene verification by an officer. Therefore, every effort should be made to provide enforcement areas for all HOV facilities. The following enforcement area configurations are listed in order of preference:

1. Continuous paved median 4.2m or wider in both directions for the length of the HOV facility. If space is available, additional enforcement areas may be built in conjunction with the 4.2m median.

2. When 4.2m continuous paved median shoulders are not possible, paved bi-directional enforcement areas spaced 3.2km to 4.8km apart should be built. A separation in the median barrier should be provided for CHP motorcycle officers to patrol the HOV facility in both directions of travel.

3. Where median width is limited, some combination of 1 and 2 should be included.

4. Paved directional enforcement areas spaced 3.2km to 4.8km apart and staggered to accommodate both directions when space limitations do not allow any of the above outlined considerations.

5. Where space is limited, directional enforcement areas located wherever right of way is available.

New HOV facilities should be built to provide adequate enforcement areas. Also, consideration should be given to adding enforcement areas to existing facilities where violation rates are consistently above 10%.

Figures 6.1, 6.2 and 6.3 represent typical enforcement areas for various median configurations mutually agreeable to Caltrans and the CHP. The widths shown for enforcement areas are 4.5m and 4.8m. However, design variations due to restrictive right of way, may indicate a lesser width is necessary. In such cases, 4.2m should be the minimum width for enforcement areas. The typical length is 400m although a minimum of 300m is acceptable. Any deviation from these typical configurations could lead to a perception of unsafe conditions by the CHP officer and result in non-use. Therefore, district alternatives, which deviate from the above options, should be resolved with the local CHP command and the appropriate Headquarters representatives. It is likely that building any enforcement areas will require an approved design exception fact sheet.

Other considerations for the design and operation of enforcement areas include the following:

A. For buffered HOV facilities, the buffer should be carried full width adjacent to the enforcement area.

B. Audible warning markers spaced 1.8m apart should be placed outside the lane striping, running parallel with the enforcement area boundary. See Warning Marker Detail, shown on Figures 6.1, 6.2 and 6.3, and Chapter 5, HOV Signs and Markings.

C. The right shoulder should not be sacrificed to provide room for enforcement areas in the median except for extreme circumstances and only with the necessary approvals.

D. Maintenance of enforcement areas should be routinely provided to avoid accumulation of debris. Excessive debris in enforcement areas may present hazards to CHP units and motorists.

E. Ensure adequate drainage.

F. Glare screens should not be installed adjacent to HOV enforcement areas. This will improve visibility and allow officers a possible escape route if an errant vehicle enters the enforcement area.

G. Enforcement areas should be avoided at ingress/ egress locations for buffer or barrier separated HOV facilities.

H. Enforcement areas should be avoided at curves. If possible, adequate sight distance should be provided.

I. To protect officers from thrown or falling objects, enforcement areas should not be placed near overcrossings.

J. Design features should ensure that enforcement areas are not perceived as traffic lanes.

Section 6.5 Other Enforcement Considerations

Enforcement techniques used on mainline HOV facilities will vary according to the design of the facility. While 4.2m paved median or enforcement areas are preferred options for new HOV facilities, they may not be possible for retrofit HOV facilities on existing freeways due to the lack of right of way. Existing facilities have a number of different geometric characteristics that impact enforcement strategies, as follows:

A. Median Width

HOV facilities created by retrofitting within the median frequently have no usable enforcement areas in the center of the freeway. The absence of a center median shoulder has an adverse impact on two important aspects of enforcement on these facilities: safety and visibility. Enforcement action on this facility requires that the violator be taken across congested mixed-flow lanes to the right shoulder. This maneuver is potentially hazardous and reduces the beneficial impact from visible enforcement.

B. Buffers

Three types of separations are currently in use on California HOV facilities:

1. Single barrier stripe (double yellow)
2. Painted barrier (two double yellow stripes)
3. Fixed barrier (concrete barrier)

Each type of separation presents special enforcement considerations. The single barrier stripe provides separation within existing, yet restricting, right of way. This type of treatment may also limit enforcement capabilities.

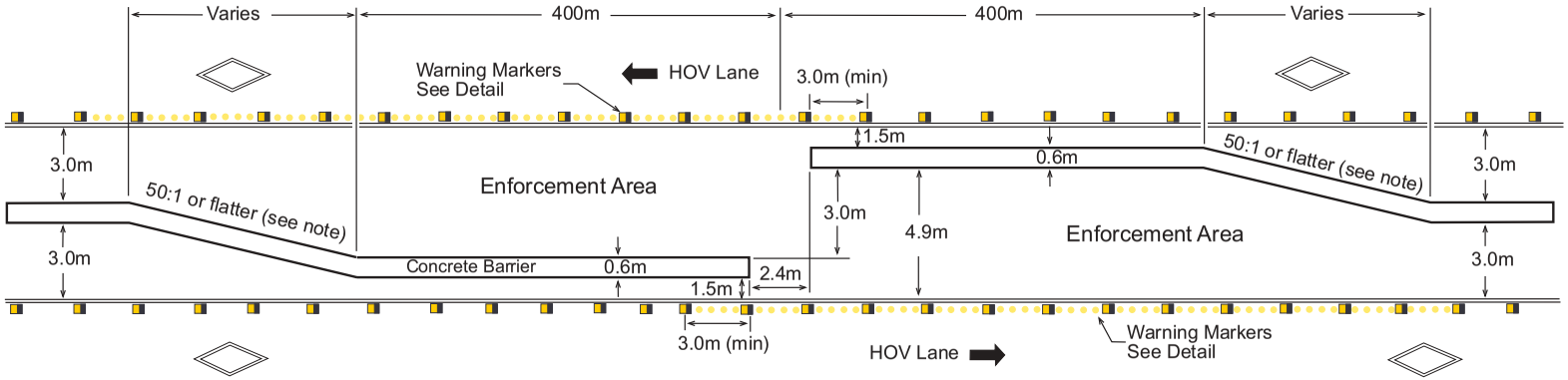
The painted barrier (buffer-separated) with two double yellow stripes presents a different enforcement challenge. If the buffer is wider than 1.2m, it creates the illusion that it may be a safe place to stop. Therefore, buffers between 1.2m and 3.6m should not be used.

The HOV facilities that are physically separated from the mixed-flow lanes by a fixed barrier (barrier-separated) tend to have the least number of occupancy violations. Any enforcement that takes place on these facilities requires an officer dedicated to that lane. The barrier may create an access issue for emergency vehicles.

The planning and design of enforcement areas must consider the impact on safety and visibility. Any deviation from the preferred geometrics requires a documented engineering analysis and a design exception approval. The optimum design is the availability of adequate enforcement areas in the median. Where existing facilities do not have these enforcement areas or new facilities are not designed with them, it can be expected that enforcement on the facility will be challenging.

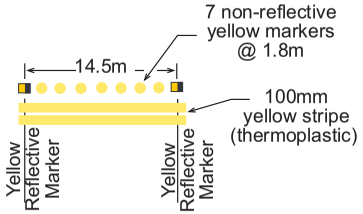
FIGURE 6.1
BI-DIRECTIONAL ENFORCEMENT AREAS FOR 7.0m MEDIANS

NOT TO SCALE



BI-DIRECTIONAL ENFORCEMENT AREA

WARNING MARKER DETAIL



NOTE:

No glare screen within the enforcement area, including taper areas.

LEGEND:

- NON-REFLECTIVE YELLOW MARKER
- ONE-WAY CLEAR REFLECTIVE MARKER
- ONE-WAY YELLOW REFLECTIVE MARKER
- 2 - ONE-WAY CLEAR REFLECTIVE MARKERS
- 100mm WHITE STRIPE (THERMOPLASTIC)
- 100mm YELLOW STRIPE (THERMOPLASTIC)
- 200mm WHITE STRIPE (THERMOPLASTIC)

Caltrans Metric

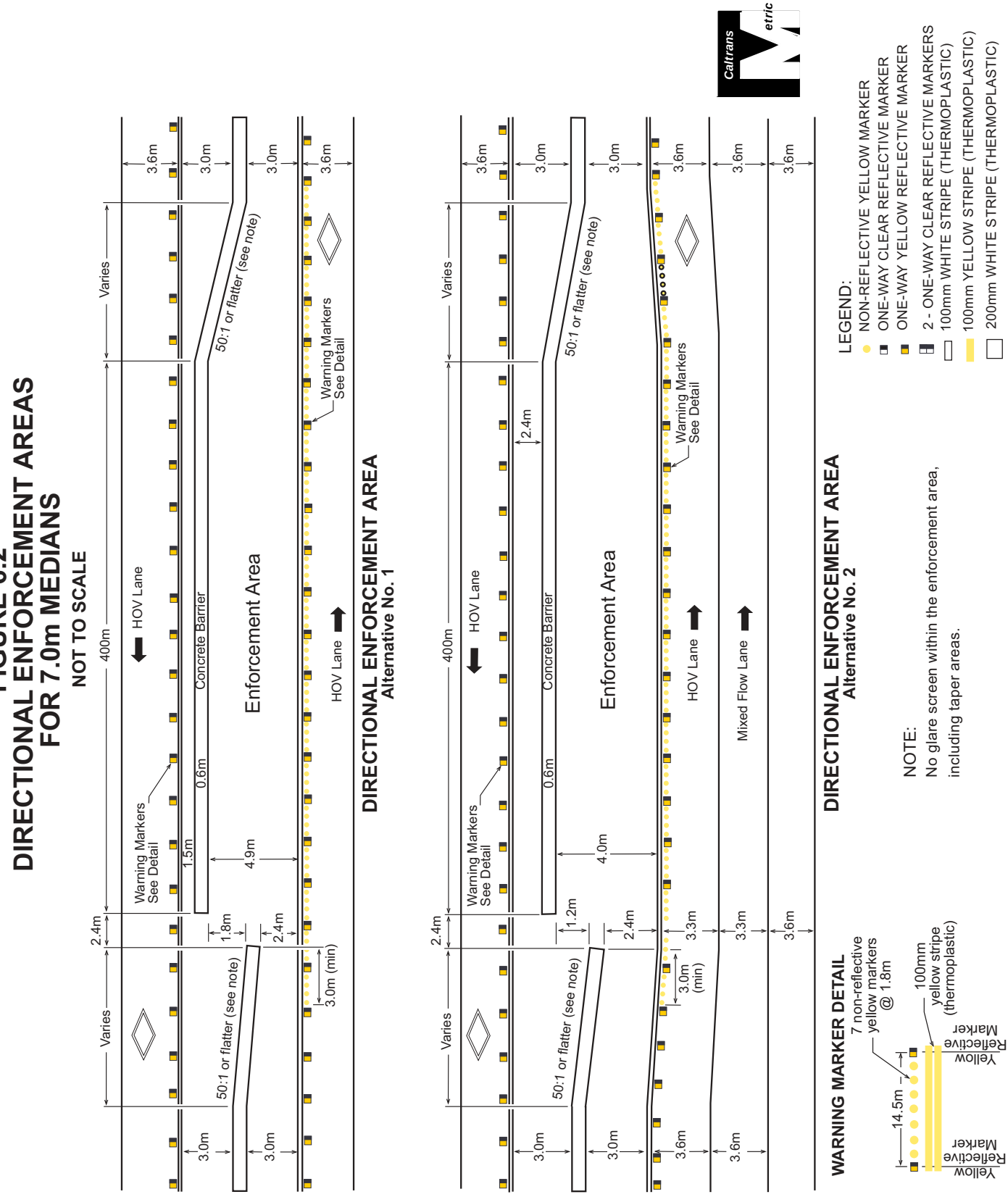
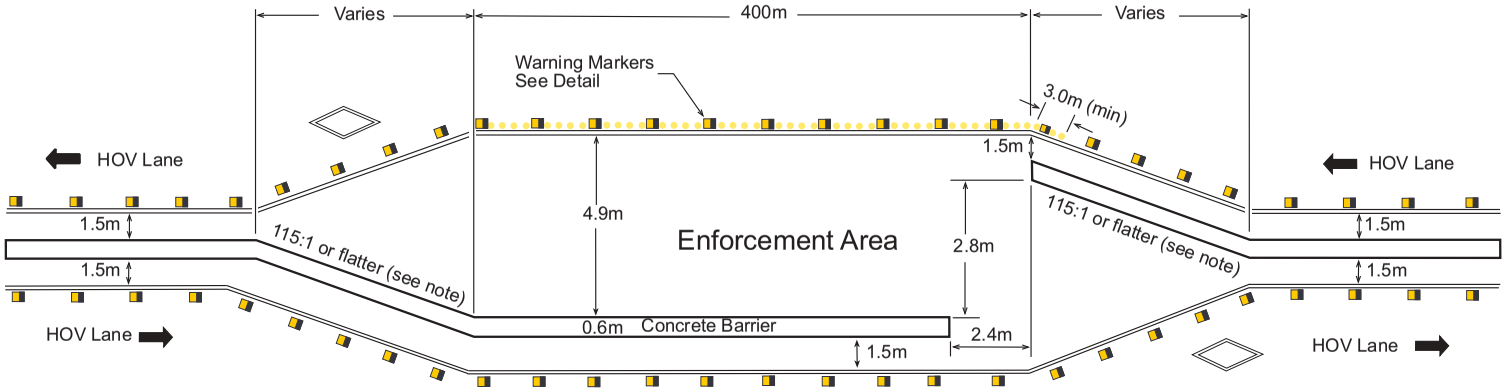


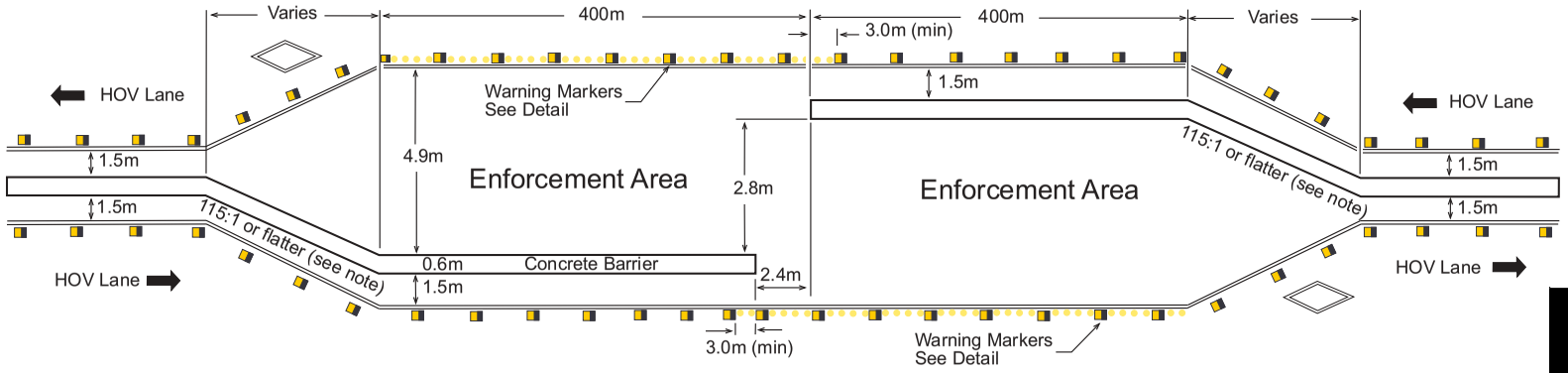
FIGURE 6.2
DIRECTIONAL ENFORCEMENT AREAS
FOR 7.0m MEDIANS
NOT TO SCALE
DIRECTIONAL ENFORCEMENT AREA
Alternative No. 1
DIRECTIONAL ENFORCEMENT AREA
Alternative No. 2
HOV Lane
Mixed Flow Lane
Concrete Barrier
Enforcement Area
Warning Markers
See Detail
50:1 or flatter (see note)
Varies
400m
2.4m
3.6m
3.0m
1.5m
0.6m
1.8m
4.9m
4.0m
1.2m
3.3m
3.0m (min)
LEGEND:
NON-REFLECTIVE YELLOW MARKER
ONE-WAY CLEAR REFLECTIVE MARKER
ONE-WAY YELLOW REFLECTIVE MARKER
2 - ONE-WAY CLEAR REFLECTIVE MARKERS
100mm WHITE STRIPE (THERMOPLASTIC)
100mm YELLOW STRIPE (THERMOPLASTIC)
200mm WHITE STRIPE (THERMOPLASTIC)
NOTE:
No glare screen within the enforcement area, including taper areas.
WARNING MARKER DETAIL
7 non-reflective yellow markers @ 1.8m
14.5m
100mm yellow stripe (thermoplastic)
Yellow Reflective Marker
Caltrans
etric

FIGURE 6.3
ENFORCEMENT AREAS FOR MEDIANS LESS THAN 7.0m

NOT TO SCALE

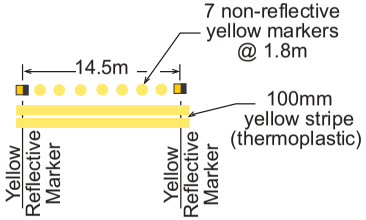


DIRECTIONAL ENFORCEMENT AREA



BI-DIRECTIONAL ENFORCEMENT AREA

WARNING MARKER DETAIL



NOTE:

No glare screen within the enforcement area, including taper areas.

LEGEND:

- NON-REFLECTIVE YELLOW MARKER
- ONE-WAY CLEAR REFLECTIVE MARKER
- ONE-WAY YELLOW REFLECTIVE MARKER
- 2 - ONE-WAY CLEAR REFLECTIVE MARKERS
- 100mm WHITE STRIPE (THERMOPLASTIC)
- 100mm YELLOW STRIPE (THERMOPLASTIC)
- 200mm WHITE STRIPE (THERMOPLASTIC)

Caltrans Metric